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Euoplos eungellaensis, sp. nov. (Idiopidae), a new golden trapdoor spider from central-eastern Queensland

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Abstract

The golden trapdoor spider genus *Euoplos* Rainbow, 1914 is endemic to Australia, and currently contains 23 species. In eastern Australia, the genus is known to occur from southern Victoria to the Cape York Peninsula of northern Queensland, however, all described species in the genus are from the southern part of this distribution – all species north of the Tropic of Capricorn are currently undescribed. Here, we take the first step in rectifying this by describing *Euoplos eungellaensis*, sp. nov. from the rainforest of the Clarke Range in central-eastern Queensland. We provide diagnostic characters for both males and females, as well as information on burrow morphology.

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https://zoobank.org/References/bdf29322-df27-4c9c-b8fb-10dbb92e5f46

Introduction

The spiny trapdoor spiders of the idiopid subfamily Arbanitinae are endemic to Australia and New Zealand (Rix et al. 2017a,b). They are the quintessential trapdoor spiders of this region, with the majority constructing deep, silk-lined burrows directly into soil substrate, and closing the entrance with a hinged door. The subfamily currently contains 11 genera, divided amongst four tribes (Aganippini, Arbanitini, Cataxiini, and Euoplini). The Aganippini and Euoplini have received extensive attention in recent years (e.g., Rix et al. 2018; Wilson et al. 2020) and our understanding of the diversity contained within them has increased substantially.

The Euoplini contains two genera, *Euoplos* Rainbow, 1914 and *Cryptoforis* Wilson, Rix & Raven, 2020, characterised by their construction of different burrow-entrance types: *Euoplos* species usually construct thick plug-doors from soil, and *Cryptoforis* species usually construct thin wafer-doors from humus fragments (Wilson et al. 2021). *Euoplos* occurs in mesic eastern and south-western Australia, and one clade has adapted to the Western Australian semi-arid zone (Rix et al. 2017a). The genus currently contains 23 described species. In mesic eastern Australia specimens that can be ascribed to *Euoplos* are distributed from southern Victoria all the way north to the Cape York Peninsula, yet so far, no species has been described from north of the Tropic of

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Capricorn, due to a lack of adult male specimens from this region.

Here, we describe the first species from north of the Tropic of Capricorn, and the only species from central or northern Queensland for which male specimens exist in collections: *Euoplos eungellaensis*, sp. nov. from the rainforests of the Clarke Range in central-eastern Queensland. This represents the first step in documenting the northern diversity of the genus, which will probably require targetted fieldwork to collect new male specimens of other undescribed species.

Methods

Euoplos eungellaensis, sp. nov. was described under a morphological species concept. All specimens examined in this study are deposited in the Queensland Museum, Brisbane (QMB), and are preserved in 70% ethanol. Digital automontage images were taken using a Leica M165C stereomicroscope with mounted DFC425 digital camera and processed using Leica Application Suite software (ver. 3.7). Measurements are in millimetres, to two decimal places. Leg segments were measured along the dorsal prolateral edge with the leg in lateral view. Total body length measurements were made in dorsal view and include the chelicerae, carapace and abdomen, but not spinnerets. Female genitalia were cleared in lactic acid at room temperature before examination and imaging.

We also highlighted the position of *Euoplos eungellaensis*, sp. nov. (Fig. 1) using the phylogeny generated in Rix et al. 2022, which was based on a concatenated sequence alignment of six protein-coding genes: mitochondrial loci cytochrome c oxidase subunit 1 (*COI*) and cytochrome b (*CYB*), and nuclear loci ribosome production factor 2 homolog (*RPF2*), 39S ribosomal protein L45, mitochondrial (*MRPL45*), histone acetyltransferase type B catalytic subunit (*HAT1*), and Xaa-Pro aminopeptidase 3 (*XPNPEP3*). Also see Rix et al. 2017a for primer and amplification details.

The following standard abbreviations are used throughout the text: ALE, anterior lateral eye(s); AME, anterior median eye(s); PLE, posterior lateral eye(s); PME, posterior median eye(s); RTA, retrolateral tibial apophysis (of male pedipalp).

Taxonomy

***Euoplos eungellaensis*, sp. nov.**

Figs. 1–26

https://zoobank.org/NomenclaturalActs/20f9af20-1f8e-4366-b4bd-1c7bc5d829e7

Holotype ♂

AUSTRALIA, Queensland: Eungella National Park, 21°06'S, 148°29'E, 700m, notophyll vine forest, 05 May 1991, K. R. McDonald (QMB S116668).

Paratypes

AUSTRALIA, Queensland: 1 ♀ and 3 juveniles, Broken River, Eungella National Park, 21°10'S, 148°30'E, rainforest, 05 October 1988, R. J. Raven, J. Gallon & T. Churchill (QMB S11178); 1 ♂, Eungella National Park, 21°06'S, 148°29'E, 700m, notophyll vine forest, 05 May 1991, K. R. McDonald (QMB S18855); 1 ♀, Eungella, near old schoolhouse on Dalrymple Road, 21°06'S, 148°32'E, 892m, excavated from burrow, riparian embankment, rainforest, 11 July 2016, J. D. Wilson, E. Amsters, M. Leister & R. J. Raven (QMB S108352); 1 ♀, same locality as previous, 21°08'S, 148°29'E, under logs, rocks, bark, etc., 15 February 1986, R. J. Raven (QMB S116669); 2 ♀, same data as previous (QMB S7037).

Other Material

AUSTRALIA, Queensland: 1 ♂, Blue Mountain, 21°29'S, 149°03'E, 930m, pitfall trap, rainforest, 23 March – 30 May 2000, D. J. Cook & G. B. Monteith (QMB S34758); 3 juveniles, Eungella, near old schoolhouse on Dalrymple Road, 21°08'S, 148°29'E, under logs, rocks, bark, etc., 15 February 1986, R. J. Raven (QMB S7027).

Diagnosis

Males of *E. eungellaensis* sp. nov. can be distinguished from all other eastern Australian species except *E. dignitas* Rix & Wilson, 2022*, E. ornatus* (Rainbow & Pulleine, 1918), and *E. spinnipes* Rainbow, 1914 by the presence of a distal protuberance and accompanying comb of macrosetae on prolateral tibia I (Fig. 16). Males can be distinguished from *E. dignitas* and *E. ornatus* by a more elongate embolus relative to the bulb and palpal tibia (Figs 5–7; cf. Rix et al. 2022, figs 21–23; Main 1985, fig. 92) and further from *E. dignitas* by their much smaller size (holotype carapace length of 14.65, compared with 26.36), and from *E. spinnipes* by the RTA, which is more distally angled relative to the tibial midline (Fig. 5; cf. Rix et al. 2017b, fig. 300), and further by their orange-brown colour, as opposed to red-brown in *E. spinnipes*.

Females of *E. eungellaensis* sp. nov. can be distinguished from all currently described eastern species except *E. spinnipes* by a complete lack of scopulae on the anterior legs. They can be distinguished from *E. spinnipes* by the retroventral row of spines on tibia I, which is unusual in *E. eungellaensis* in comprising three spines (Fig. 25), rather than four as in almost all other *Euoplos* species (see Wilson et al., 2020, fig. 6i,j).

Description – male holotype (QMB S116668)

Total length 14.65. *Carapace:* 6.18 long, 5.51 wide (length/width = 1.12); orange-brown; with few short bristles on pars thoracica, and longer bristles around margin; fovea slightly procurved (length/width = 0.15) (Fig. 8). *Ocular region:* on raised mound (Fig. 10); eye group rectangular (width/length = 2.07); length 0.62, anterior width 1.28, posterior width 1.26. Eye diameters: ALE (0.41) > PLE (0.35) > AME (0.30) > PME (0.26) (Fig. 11).

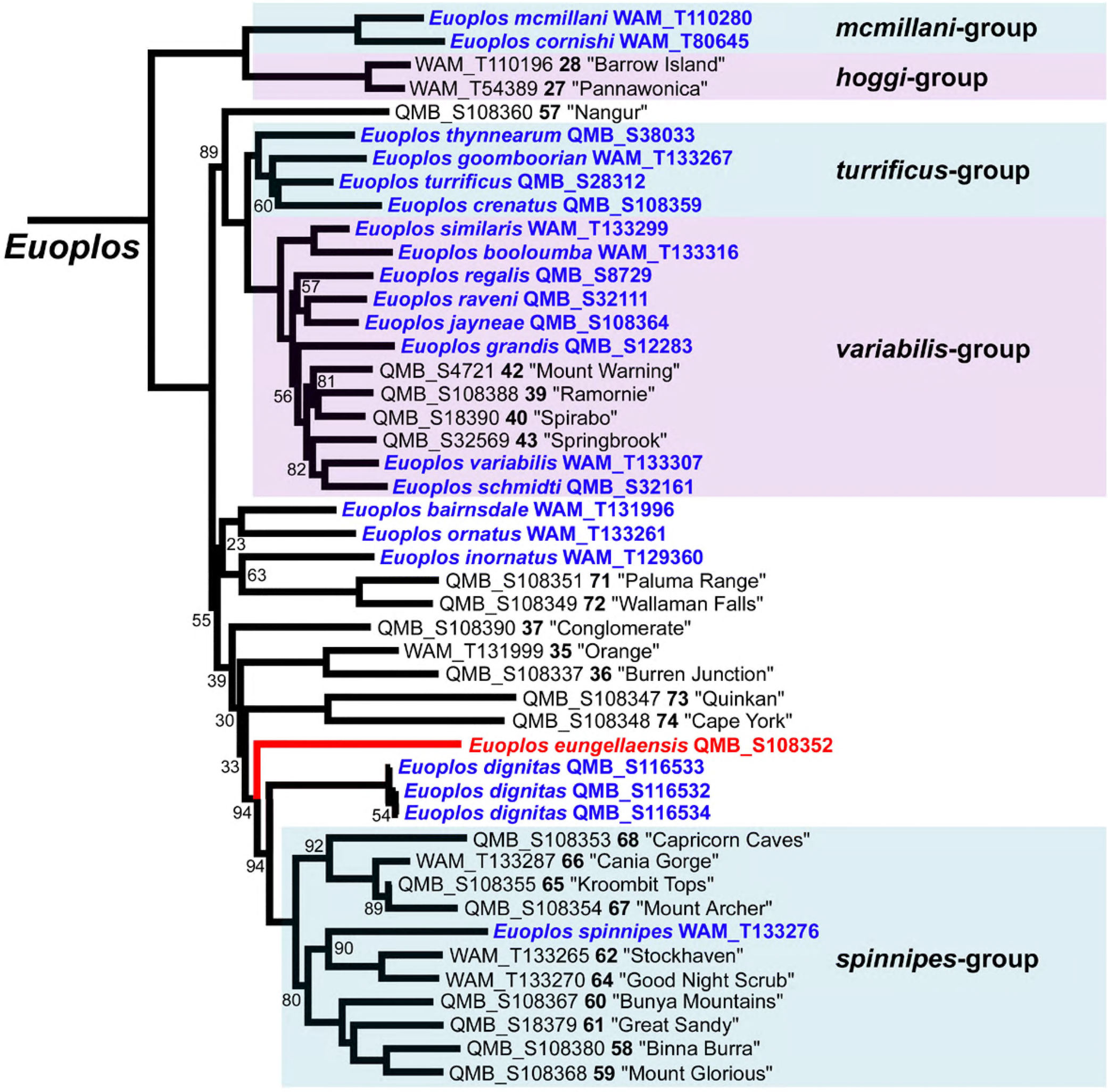


Figure 1. Phylogeny of the genus *Euoplos* (expanded from the molecular-only taxon sample of Wilson et al. 2020, fig. 3; and modified from Rix et al. 2022, fig. 1), inferred from a W-IQ-TREE maximum likelihood analysis of the Wilson et al. (2020) six gene molecular dataset (63 taxa, 4,108 bp). Nodes have an ultrafast bootstrap value of ≥ 0.95 unless otherwise stated. Previously named species are shown in blue text, except *E. eungellaensis* sp. nov., which is highlighted in red. Undescribed species codes are as per Wilson et al. (2020).

Mouthparts: maxillae with about 20 cuspules on antero-ental edge; labium 1.59x wider than long, without cuspules (Fig. 12). *Sternum:* length/width = 1.05; posterior sigilla moderate, ovoid, equidistant between sternum edge and centerline (Fig. 13). *Abdomen:* 5.79 long, 4.23 wide, ovoid; dorsal surface lightl-brown with beige chevrons, ventral surface beige; sparse coat of hair-like setae (Figs 9, 14). *Legs:* concolorous with carapace; scopulae on ventral tarsi; leg I length = 19.34 (5.88, 2.90, 3.99, 4.11, 2.46); leg I length/carapace length = 3.13; tibia I length/width = 4.68 (Fig.15). *Tibia I:* with single prolateral pertuberance armed with two macrosetae (Fig. 16). *Pedipalp:* tibia 2.14x longer than wide in retrolateral view; RTA small, conical, projecting from position about 60% of the way along tibia; field of 90–100 spinules on/around RTA; cymbium armed only with hair-like setae (without spine-like setae) (Figs 5–7). *Copulatory organ:* total length about 55% of palpal tibia length; embolus about 1.65x length of bulb, curved and twisted about 90°, tip about 0.3x width of base (Figs 5–7).

Description – female paratype (QMB S116669)

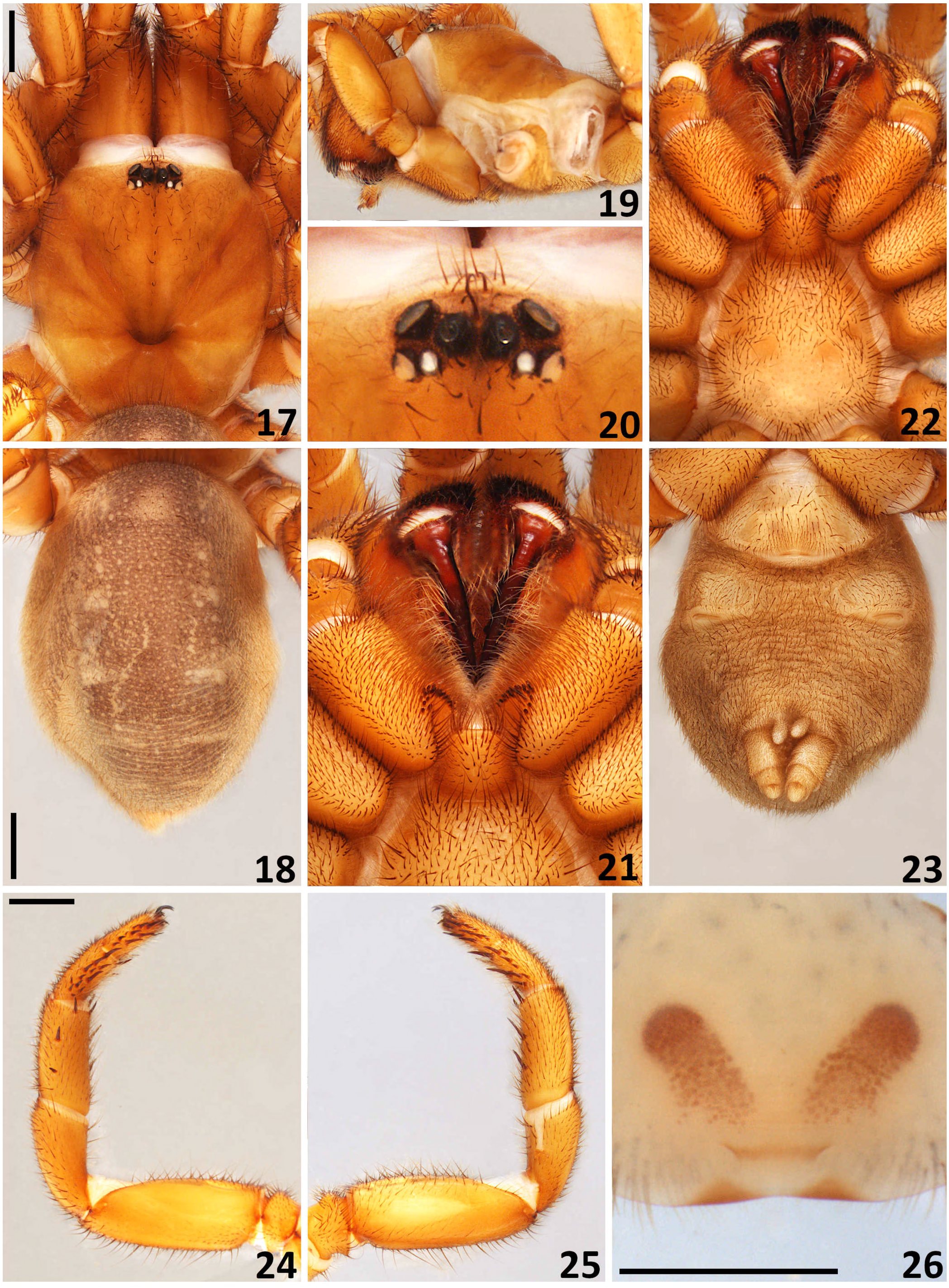
Total length 24.15. *Carapace*: 8.67 long, 8.14 wide (length/width = 1.06); orange-brown (darker in life; Fig. 2); glabrous; fovea strongly procurved (length/width = 0.29) (Fig. 17). *Ocular region*: eyes on slight tubercle (Fig.

Figures 2–4. Live female habitus of *Euoplos eungellaensis*, sp. nov. (QMB S108352) from Eungella, near the old schoolhouse on Dalrymple Rd (2) and the burrow entrance of the same specimen (3, 4).

Figures 5–7. *Euoplos eungellaensis* sp. nov., male holotype (QMB S116668) Eungella National Park, Queensland, pedipalp morphology: 5, retrolateral view; 6, retroventral view; 7, prolateral view. Scale bar 2mm.

19); eye group compact, rectangular (width/length = 2.02), length 0.92, anterior width 1.76, posterior width 1.85, ALE (0.53) > PLE (0.42) > AME (0.39) > PME (0.29) (Fig. 20). *Mouthparts*: rastellum of many thorn-like spines on pronounced mound on chelicerae; maxillae with ~25 cuspules on antero-ental edge; labium 1.28x wider than long, without cuspules (Fig. 21). *Sternum*: widest between coxae of legs II and III; length/width = 0.98; anterior and medial sigilla small and marginal, posterior sigilla larger (max diameter = 0.18x sternum length), ovoid, central (Fig. 22). *Abdomen*: 10.96 long, 7.77 wide, oval; light brown dorsally (darker in life; Fig. 2), beige ventrally, with inconspicuous beige spots; light coat of hairs; spinnerets with spigots on all segments, apical segments domed (Figs 18, 23). *Legs*: concolorous with carapace, without scopulae; leg I length 16.51 (5.32,

Figures 8–16. *Euoplos eungellaensis* sp. nov., male holotype (QMB S116668) from Eungella National Park, Queensland, somatic morphology: 8, 9, carapace and abdomen, dorsal view; 10, cephalothorax, lateral view; 11, eyes, dorsal view; 12, mouthparts, ventral view; 13, 14, cephalothorax and abdomen, ventral view; 15, leg I, prolateral view; 16, leg I tibia, prolateral view. Scale bars 2mm.



Figures 17–26. *Euoplos eungellaensis* sp. nov., female paratype (QMB S116669) from Eungella, near schoolhouse on Dalrymple Rd, Queensland: 17, 18, carapace and abdomen, dorsal view; 19, cephalothorax, lateral view; 20, eyes, dorsal view; 21, mouthparts, ventral view; 22, 23,

cephalothorax and abdomen, ventral view; 24, leg I, prolateral view; 25, leg I, retrolateral view; 26, spermathecae, dorsal view. Scale bars 2mm (17, 18, 24), 1mm (26).

4.01, 3.18, 1.56, 1.77), leg I length/carapace length = 1.90, tibia length/width = 2.04 (Figs 24, 25). *Leg spines*: anterior legs with lateral spines; left leg I = femur 0, patella 0, tibia 7 (3PL, 1V and 3RL), metatarsus 24 (13PL, 11RL), tarsus 20 (9PL, 11RL), total = 51 (Figs 24, 25); posterior legs with lateral and dorsal spines, few ventral (except on tarsi); several thorn-like spines on prolateral patella III. *Internal genitalia*: paired spermathecae diverging at an angle of ~90°; entirely sclerotised, crowns slightly darker; length ~2.2x width; distance between bases about equal to crown width (Fig. 26).

Etymology

The specific epithet is in reference to the type locality of this species in Eungella National Park.

Natural History

This species is known only from rainforest habitats on the Clarke Range, in the national park around the town of Eungella. The habitat is high elevation sub-tropical rainforest, and is often shrouded in cloud. Large sections of this habitat were burnt in 2018. The species has been found on stable soil embankments, where it makes deep burrows with plug-door entrances (Figs 3, 4). Although few males of this species have been collected, most appear to have fallen into pit-fall traps in autumn (March and May), indicating that this is when adult males leave their burrows to find females.

Remarks

This species was included in the previously published molecular phylogeny of Wilson et al. (2018) as "lineage 6" (on the map and phylogeny) and in Wilson et al. (2020) and Rix et al. (2022) as *Euoplos* sp. "**70** Eungella" (Fig. 1), where it was recovered as the sister-lineage to the *spinnipes*-group plus *E. dignitas*.

Sequence Data

The following sequence data are available on GenBank for this species (Wilson et al. 2020):

Female, QMB S108352: *COI* (MG829693); *Cytb* (MG829760); *RPF2* (MG829822); ITS1-5.8S rRNA-ITS2 (MG835826); *MRPL45* (MN985569); *XPNPEP3* (MN985597); *HAT1* (MN985546).

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